

## NATIONAL EXTRA SET - 1

### TOSS-UP

1. **GENR; Multiple Choice:** Which of the following elements is not essential to living animals?

(W) Nitrogen  
(X) Zinc  
(Y) Nickel  
(Z) Copper

**ANSWER: Y-- NICKEL**

### BONUS

1. **GENR; Multiple Choice:** About what year was the investigation of the pressure and temperature of air at high altitudes in manned balloons first done?

(W) 1400  
(X) 1600  
(Y) 1800  
(Z) 1900

**ANSWER: Y—1800**

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### TOSS-UP

2. **PHYS; Multiple Choice:** The color of a piece of very hot steel varies with its temperature. Which of the following colors indicates the highest temperature?

(W) Yellow  
(X) Orange  
(Y) Reddish orange  
(Z) Dark red

**ANSWER: W-- YELLOW**

### BONUS

2. **PHYS; Multiple Choice:** The random movement of dust particles in a room is an example of

(W) Inelastic collisions.  
(X) Elastic collisions.  
(Y) Brownian motion.  
(Z) Vortexes.

**ANSWER: Y-- BROWNIAN MOTION**

**TOSS-UP**

**3 BIOL; Multiple Choice: The sea lilies and feather stars are**

- (W) in the most ancient class of echinoderms.**
- (X) detritus feeders.**
- (Y) the only echinoderms with sharp spines.**
- (Z) sessile organisms.**

**ANSWER: W-- IN THE MOST ANCIENT CLASS OF ECHINODERMS**

**BONUS**

**3 BIOL; Multiple Choice: The part of the nervous system many echinoderms use for balance consists of**

- (W) radial nerves.**
- (X) statocysts.**
- (Y) light-sensitive cells.**
- (Z) nerve rings.**

**ANSWER: X-- STATOCYSTS**

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**TOSS-UP**

**4 ASTR; Multiple Choice: Prominences and flares on the sun are related to sunspots because they are all caused by**

- (W) electricity.**
- (X) too much heat.**
- (Y) Earth's orbit around the sun.**
- (Z) intense magnetic fields.**

**ANSWER: Z-- INTENSE MAGNETIC FIELDS**

**BONUS**

**4 ASTR; Multiple Choice: Pluto was closest to the Sun in 1989. About how many years will elapse after 1989 before it will be that close again?**

- (W) 64**
- (X) 248**
- (Y) 198**
- (Z) 124**

**ANSWER: X-- 248**

**TOSS-UP**

5. **CHEM; Multiple Choice:** Which of the following elements can form the greatest number of covalent bonds?

(W) carbon  
(X) nitrogen  
(Y) oxygen  
(Z) sulfur

**ANSWER: Z-- SULFUR**

**BONUS**

5. **CHEM; Multiple Choice:** A process in which substances are separated through differences in the rates at which the components migrate is called

(W) filtration.  
(X) chromatography.  
(Y) elution.  
(Z) titration.

**ANSWER: X-- CHROMATOGRAPHY**

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**TOSS-UP**

6. **COMP; Multiple Choice:** You are laying out the logic of your computer program before you begin writing it. The graphical representation that you create is called a

(W) file.  
(X) simulation.  
(Y) listing.  
(Z) flowchart.

**ANSWER: Z-- FLOWCHART**

**BONUS**

6. **COMP; Multiple Choice:** The Defense Advanced Research Projects Agency funds research projects for defense systems in the following areas except

(W) atmospheric conditions analysis.  
(X) robotics.  
(Y) chip design.  
(Z) artificial intelligence.

**ANSWER: W-- ATMOSPHERIC CONDITIONS ANALYSIS**

**TOSS-UP**

**7. BIOL; Multiple Choice: Unlike most chordates, lancelets lack**

- (W) a circulatory system.**
- (X) an anus.**
- (Y) jaws.**
- (Z) nerves.**

**ANSWER: Y-- JAWS**

**BONUS**

**7. BIOL; Multiple Choice: Lancelets move by bending their bodies back and forth because they lack**

- (W) muscles.**
- (X) appendages.**
- (Y) nerves.**
- (Z) gills.**

**ANSWER: X-- APPENDAGES**

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**TOSS-UP**

**8. PHYS; Multiple Choice: In a fiber optic communications systems electrical signals are converted to flashes of light. These flashes are transmitted down a thin glass fiber. They can travel long distances by successive internal**

- (W) diffusion.**
- (X) refraction.**
- (Y) reflection.**
- (Z) dispersion.**

**ANSWER: Y-- REFLECTION**

**BONUS**

**8. PHYS; Multiple Choice: You have an aquarium with a small boat floating in it. In the boat are some small dense rocks. You drop the rocks overboard into the tank. Does the water level in the tank**

- (W) rise.**
- (X) fall.**
- (Y) remain the same.**
- (Z) none of the above**

**ANSWER: X-- FALL**

**TOSS-UP**

**9 ERSC; Multiple Choice: Chemosynthesis is a process that takes place**

- (W) in ocean trenches.**
- (X) along shorelines.**
- (Y) in coral reefs.**
- (Z) in deep-ocean vents.**

**ANSWER: Z-- IN DEEP-OCEAN VENTS**

**BONUS**

**9 ERSC; Multiple Choice: Approximately how many known minerals are there on Earth?**

- (W) 400**
- (X) 2000**
- (Y) 4000**
- (Z) 10,000**

**ANSWER: Y-- 4000**

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**TOSS-UP**

**10 CHEM; Multiple Choice: Crystals of ice are**

- (W) isometric.**
- (X) tetragonal.**
- (Y) hexagonal.**
- (Z) orthorhombic (pron: or'-tho-rom'bic).**

**ANSWER: Y-- HEXAGONAL**

**BONUS**

**10 CHEM; Multiple Choice: Vegetable oil is made into margarine through**

- (W) halogenation.**
- (X) partial hydrogenation.**
- (Y) methylation.**
- (Z) oxidation.**

**ANSWER: X-- PARTIAL HYDROGENATION**

**TOSS-UP**

**11. BIOL; Multiple Choice: The skeleton of an echinoderm is an**

- (W) endoskeleton of calcium carbonate plates.**
- (X) endoskeleton of chitin plates.**
- (Y) exoskeleton of calcium carbonate plates.**
- (Z) exoskeleton of chitin plates.**

**ANSWER: W-- ENDOSKELETON OF CALCIUM CARBONATE PLATES**

**BONUS**

**11. BIOL; Multiple Choice: Planarians have eyespots that are specialized to**

- (W) detect light.**
- (X) determine color.**
- (Y) determine motion.**
- (Z) form images.**

**ANSWER: W-- DETECT LIGHT**

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**TOSS-UP**

**12. CHEM; Multiple Choice: Mayonnaise is**

- (W) a coalescent (pron: co-uh-less'cent) solution.**
- (X) a hydrogenated oil.**
- (Y) a covalent solution.**
- (Z) an emulsion.**

**ANSWER: Z-- AN EMULSION**

**BONUS**

**12. CHEM; Multiple Choice: The type of crystal lattice exemplified in a diamond is**

- (W) an ionic crystal.**
- (X) a covalent molecular crystal.**
- (Y) a metallic crystal.**
- (Z) a covalent network crystal.**

**ANSWER: Z-- A COVALENT NETWORK CRYSTAL**

**TOSS-UP**

**13 MATH; Multiple Choice: A square matrix that has all zeros below the main diagonal is called**

- (W) upper triangular.**
- (X) singular.**
- (Y) lower triangular.**
- (Z) invertable.**

**ANSWER: W-- UPPER TRIANGULAR**

**BONUS**

**13 MATH; Short Answer: how many different 6-letter permutations can be formed from the letters in the word "DELETE"? (spell out D-E-L-E-T-E)**

**ANSWER: 120**

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**TOSS-UP**

**14 GENR; Short Answer: What was the first animal launched into orbit around the earth?**

**ANSWER: DOG**

**BONUS**

**14 GENR; Short Answer: Name the medical term given to the inflammation or infection of the mucous membranes of the nose.**

**ANSWER: RHINITIS (pron: rye-nigh-dus)**

**TOSS-UP**

**15. BIOL; Multiple Choice: The opening of the round central cavity of a developing embryo is the**

- (W) body cavity.
- (X) blastopore.
- (Y) coelom.
- (Z) mantle cavity.

**ANSWER: X-- BLASTOPORE**

**BONUS**

**15. BIOL; Multiple Choice: In deuterostomes, the mesoderm is produced from pouches of**

- (W) ectoderm.
- (X) endoderm.
- (Y) body cavity.
- (Z) coelom.

**ANSWER: X-- ENDODERM**

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**TOSS-UP**

**16. ASTR; Multiple Choice: Name the Greek scientist who made a rough calculation of the Earth's circumference about 240 B.C.**

- (W) Thales
- (X) Aristotle
- (Y) Eratosthenes (pron: er-et-tas-the-nees)
- (Z) Archimedes

**ANSWER: Y-- ERATOSTHENES**

**BONUS**

**16. ASTR; Short Answer: The I-A-U is responsible for assigning names to objects in space. What does IAU stand for?**

**ANSWER: INTERNATIONAL ASTRONOMICAL UNION**



**TOSS-UP**

**17. PHYS; Multiple Choice: A frictionless heat engine can be 100% efficient only if its exhaust temperature is**

- (W) equal to its input temperature.**
- (X) less than its input temperature.**
- (Y) 0 degrees Celsius.**
- (Z) 0 degrees Kelvin.**

**ANSWER: Z-- 0 DEGREES KELVIN**

**BONUS**

**17. PHYS; Multiple Choice: A refrigerator is basically a**

- (W) boiler.**
- (X) compressor.**
- (Y) heat pump.**
- (Z) turbine.**

**ANSWER: Y-- HEAT PUMP**

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**TOSS-UP**

**18. CHEM; Multiple Choice: The inventor of the Kelvin temperature scale was**

- (W) K. Cavendish II.**
- (X) Lord William H. Hamison.**
- (Y) Sir William Thomson.**
- (Z) Michael Faraday.**

**ANSWER: Y-- SIR WILLIAM THOMSON (Lord Kelvin)**

**BONUS**

**18. CHEM; Short Answer: Jaroslav Heyrovsky (pron: Ha'vra-ski) of Czechoslovakia received the 1959 Nobel Prize in chemistry for developing what technique used in chemical analysis?**

**ANSWER: POLAROGRAPHY**

**TOSS-UP**

19. **ERSC; Multiple Choice:** Hawaii's youngest volcano, Lo'ihi (pron: low-ee-hee), is 3 kilometers high but still 1 kilometer beneath the surface of the sea. About how many years will elapse before the volcano's summit is above the surface of the sea?

(W) 5,000  
(X) 25,000  
(Y) 50,000  
(Z) 100,000

**ANSWER: Y-- 50,000**

**BONUS**

19. **ERSC; Multiple Choice:** Lake Baikal in Siberia is not only the deepest lake in the world, it is also the oldest. About how old is it estimated to be?

(W) 50,000 years  
(X) 500,000 years  
(Y) 5,000,000 years  
(Z) 25,000,000 years

**ANSWER: Z-- 25,000,000 YEARS**

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**TOSS-UP**

20. **COMP; Multiple Choice:** The first generation of computers used vacuum tubes to perform digital switching. What electronic device replaced the vacuum tube and greatly improved the dependability of computing machines?

(W) Integrated Circuit  
(X) Diode  
(Y) Transistor  
(Z) Relay

**ANSWER: Y-- TRANSISTOR**

**BONUS**

20. **COMP; Multiple Choice:** Which of the following is NOT a programming language?

(W) C  
(X) Pascal  
(Y) Babbage  
(Z) Lisp

**ANSWER: Y-- BABBAGE**

**TOSS-UP**

**21. BIOL; Short Answer: What is your buccal cavity?**

**ANSWER: YOUR MOUTH**

**BONUS**

**21. BIOL; Multiple Choice: Flatworms do not have**

**(W) a solid mass of mesoderm.**

**(X) an outer layer of ectoderm.**

**(Y) an inner layer of ectoderm.**

**(Z) a body cavity.**

**ANSWER: Z-- A BODY CAVITY**

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**TOSS-UP**

**22. MATH; Short Answer: What is the sum of the interior angles in a hexagon?**

**ANSWER: 720 DEGREES**

**BONUS**

**22. MATH; Short Answer: What is the length of the longest very thin rod that can be placed in a box whose dimensions are 2 inches by 4 inches by 4 inches**

**ANSWER: 6 INCHES**

**TOSS-UP**

- 23. PHYS; Short Answer:** An electric clothes dryer is connected to a 200-volt source. How much current does it use if it requires 2,000 watts of electric power?

**ANSWER: 10 AMPERES**

**BONUS**

- 23. PHYS; Multiple Choice:** A four cycle internal combustion automobile engine operates on what kind of cycle?

(W) Rankine  
(X) Otto  
(Y) Brayton  
(Z) Joule

**ANSWER: X-- OTTO**

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**TOSS-UP**

- 24. CHEM; Short Answer:** What is the name of the bond that joins amino acids together in a protein?

**ANSWER: PEPTIDE BOND or AMIDE**

**BONUS**

- 24. CHEM; Multiple Choice:** Of the following liquids, which is most dense?

(W) water  
(X) gasoline  
(Y) acetone  
(Z) chloroform

**ANSWER: Z-- CHLOROFORM**

**TOSS-UP**

25. **PHYS; Short Answer:** The actual mechanical advantage of a block and tackle is 5. The ideal mechanical advantage is 6. How many strands support the mass to be lifted?

**ANSWER: 6**

**BONUS**

25. **PHYS; Multiple Choice:** A proton and an alpha particle pass through the gap of a strong magnet. If both particles have the same initial velocity, how many times greater will the deflection of the proton be relative to the deflection of the alpha particle?

(W) the same

(X) 2 times

(Y) 4 times

(Z) 8 times

**ANSWER: X- 2 TIME**